A BRIEF
(Yet full)
ACCOUNT
OF THE
DOCTRINE
OF
Vulgar and Decimal
FRACTIONS
WITH A
Specimen of their Demonſtrations.

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LONDON,
Printed; Sold by Mr. *Mount* at the *Poſtern* on *Tower-Hill*, Mr. *Lea*, *Globe-maker* in *Cheapſide*. Mr. *Worgan*, *Mathematick-Inſtrument-maker*, under St. *Dunſtan*'s Church in *Fleetſtreet*; and by the Author, at his Houſe in *Channel-Row*, *Weſtminſter*, 1698.

BIBLIOTH:
GEORG:AVGVST.
DONAT:
UFFENBACH
1769.

THE PREFACE.

Reader,

Thou art here presented with a ſhort Treatiſe of Vulgar *and* Decimal Fractions, *Quantities of ſuch great and general Uſe, that without the Knowledge of them there can be no Compleat, or Correct Accomptant.*

I have therefore in this Critical Age adventur'd to present the Publick with this ſmall Tract, in which I have endeavoured to be Methodical and Plain, and to digeſt the Rules in ſuch Order, with ſeveral Exemplications of the ſame, that

that I hope they will be rendred intelligible, and ſerviceable to the meaneſt Capacity.

Laſtly, I have added a Specimen of the Demonſtration of each particular Operation: All which to the Ingenious I willingly preſent, hoping of their favourable Acceptance; and that they may receive ſome Benefit from the ſame, is the hearty Wiſh of their real Friend

W. Alingham.

THE

THE DOCTRINE OF Vulgar Fractions.

What a Fraction is, and how read.

AN *Unite*, or *Integer*, is one whole thing, as, one Pound, one Yard, one Gallon, one Hour, &c.

A *Fraction*, or *broken Number*, is a part, (or parts) of an Unite, or Integer; and is generally represented by two Numbers set one over the other, with a Line between them, thus, $\frac{1}{2}$. $\frac{2}{3}$. $\frac{3}{4}$. $\frac{5}{7}$, &c. The upper number is termed the *Numerator*; the lower the *Denominator*, they are read, or pronounced, thus, $\frac{1}{2}$ is *one half*, $\frac{2}{3}$ is *two thirds*, $\frac{3}{4}$ is *three fourths*, $\frac{5}{7}$ is *five sevenths*, and so of any other, naming the Numerator first, and the Denominator last; the Denominator

ſhewing the parts into which the Unite, or Integer, is broke, and the Numerator, the part, (or parts) of the Denominator that is to be taken, or uſed.

Of the Varieties of Fractions.

OF *Fractions*, or broken Numbers, there are four ſorts, *viz. Proper, Improper, Mixt* and *Compound.*

A *proper Fraction* is, that whoſe Numerator is leſſer than the Denominator, as $\frac{1}{2}$. $\frac{2}{3}$. $\frac{3}{4}$. $\frac{4}{5}$. &c.

An *Improper Fraction*, is, that whoſe Numerator is greater than (or, at leaſt equal to) the Denominator, as $\frac{4}{3}$ $\frac{5}{2}$ $\frac{6}{6}$ $\frac{4}{4}$ &c.

Mixt, are whole Numbers and Fractions ſet together thus, $2\frac{1}{3}$, $3\frac{5}{6}$, $7\frac{3}{4}$, &c.

Compound Fractions are known, by having the word [*Of*] betwixt them, and are written thus, $\frac{2}{3}$ of $\frac{3}{4}$, alſo $\frac{1}{4}$ of $\frac{5}{6}$ of $\frac{7}{8}$. They are likewiſe called Fractions of Fractions.

Now before we can paſs to the Rules of *Addition, Subſtraction, Multiplication* and *Diviſion* in Fractions, they muſt be prepar'd, and made fit for ſuch Operation, and this preparation is perform'd by *Reduction*, of which there are five kinds, as follows,

Reduction

Reduction the First.

TEacheth how to reduce a whole, or mixt Number, into an *Improper Fraction*, which Fraction ſhall be equal in value to the ſaid whole, or mixt Number: And contrary, that is, it teacheth to turn an improper Fraction into its Equivalent whole, or mixt Number.

CASE I. If it be a whole Number, the Rule is, multiply it by the aſſign'd Denominator, ſeting the Product thereof for a Numerator over the ſaid Denominator, ſo ſhall this Fraction be equal to the given whole Number.

Example. Reduce 7 into an Improper Fraction, whoſe Denominator ſhall be 4.

7 whole Number,
4 aſſign'd Denom. So that $7 = \frac{28}{4}$.

28 Numerator requir'd.

Note, That theſe two Lines = is the ſign of Equality, as $7 = \frac{28}{4}$ ſhows that 7 is equal to 28 Fourths.

More Examples.

$$\text{Reduce} \begin{Bmatrix} 5 \\ 8 \\ 9 \end{Bmatrix} \begin{matrix} \text{into a Fraction,} \\ \text{whoſe Denom. is} \end{matrix} \begin{Bmatrix} 4 \\ 6 \\ 7 \end{Bmatrix}$$

CASE 2. If a mixt Number is given to be reduc'd, the Rule is, multiply the whole Number by the Denominator of the Fraction, adding thereto its Numerator, the Sum ſhall be a new Numerator which, if ſet over the old Denominator will give a Fraction of the ſame value with the propos'd mixt Number.

Exam. Reduce $2\frac{3}{4}$ into an Improper Fraction.

$2\frac{3}{4}$
4 Denom. So that $2\frac{3}{4} = \frac{11}{4}$.

11 new Numer.

More Examples.

Reduce $\left\{\begin{array}{l} 3\frac{5}{7} \\ 6\frac{2}{3} \\ 5\frac{4}{9} \end{array}\right\}$ into an Improper Fraction.

CASE 3. If an Improper Fraction is to be reduced into its Equivalent whole, or mixt Number; the Rule is, divide the Numerator by the Denominator, ſo will the Quotient give a whole Number equal to the Fraction given.

Exam. Reduce $\frac{28}{4}$ into its Equivalent whole Number.

4) 28 (7 the whole Number requir'd.
28

00 So that $\frac{28}{4} = 7$.

More

More Examples.

Reduce $\left\{\begin{matrix} \frac{20}{4} \\ \frac{48}{6} \\ \frac{63}{7} \end{matrix}\right\}$ into its Equivalent whole Numb.

If after dividing any thing remain, ſet it for a Numerator over the Fractions Denominator, and join the ſaid Fraction to the Quotient.

Exam. Reduce $\frac{11}{4}$ into its Equivalent mixt Number.

$$
\begin{array}{l}
4)\,11\,(\,2\tfrac{3}{4} \quad \text{mixt Numb.} \\
\quad\ 8 \\
\hline
\quad\ 3
\end{array}
$$

More Examples.

Reduce $\left\{\begin{matrix} \frac{26}{7} \\ \frac{20}{3} \\ \frac{49}{9} \end{matrix}\right\}$ into its Equivalent mixt Numb.

This Reduction is abſolutely neceſſary, for there is no working with whole Numbers and Fractions, till the whole Numbers are turn'd into Fractions.

Reduction the Second,

TEacheth you how to reduce a com-pound Fraction to a Simple one, which ſhall have the ſame value with it.

 RULE.

RULE.

Multiply all the Denominators one into another continually, and set the Product thereof for a Denominator; so likewise multiply all the Numerators one into another, and set the Product for a Numerator over the former Denominator, the Fraction thus form'd is Equivalent to the given compound Fraction.

Example,

Reduce $\frac{3}{4}$ of $\frac{8}{9}$ of $\frac{9}{12}$ to a simple Fraction.

3 Numer. 1st.	4 Den. 1st.
8 Numer. 2d.	9 Den. 2d.
24	36
9 Numer. 3d.	12 Den. 3d.
216 Numer. sought	432 Den. sought.

So that $\frac{3}{4}$ of $\frac{8}{9}$ of $\frac{9}{12} = \frac{216}{432}$.

$$\text{Reduce}\left\{\begin{array}{l} \frac{4}{5} \text{ of } \frac{5}{6} \text{ of } \frac{8}{9} \\ \frac{3}{6} \text{ of } \frac{6}{7} \text{ of } \frac{7}{9} \\ \frac{32}{35} \text{ of } \frac{7}{8} \text{ of } \frac{10}{12} \end{array}\right\}\text{to a simple Fraction}$$

This Reduction is likewise absolutely necessary, for there is no working with Compound Fractions, and others, till the said Compounds are reduc'd to Simple.

Redu-

Reduction the Third.

TEacheth how to abreviate a Fraction, or to find a Number that ſhall reduce it to its loweſt Terms at one Operation, yet ſtill keeping the ſame value it had at firſt.

RULE 1ſt.

Divide the Numerator and Denominator (if they be both even) by 2. 4. 6. 8. &c. (If the Numerator and Denominator be one even, and the other odd, then try ſome odd Number, as 3. 5. 7. 9. &c.) that will divide both without a remainder; repeat this Diviſion as often as you can, ſo ſhall the laſt Quotient of the Numerator be a new Numerator, and the laſt Quote of the Denominator, a new Denominator.

Example.

Reduce $\frac{216}{432}$ into its loweſt Terms.

$\frac{216}{432} \overset{4}{|} \frac{54}{108} \overset{2}{|} \frac{27}{54} \overset{3}{|} \frac{9}{18} \overset{9}{|} \frac{1}{2}$ So that $\frac{216}{432} = \frac{1}{2}$.

More Examples.

Reduce $\left\{ \begin{array}{c} \frac{160}{270} \\ \frac{216}{378} \\ \frac{2240}{3360} \end{array} \right\}$ into its loweſt Terms.

But

But the general way of reducing a Fraction to its lowest Terms, is, to find a Common Measurer, that is, the greatest number, which will divide the Numerator and Denominator without a Remainder, by which means a Fraction is brought to its lowest terms at the first work: For finding of which the Rule is;

RULE 2d.

Divide the Denominator by the Numerator, and if any thing remain by it, divide the former Divisor, and if after this division any thing remain, divide the last divisor by it: *Proceed* thus till nothing remain, so shall the last Divisor be the greatest common Measurer, and is a Number that will divide both Numerator and Denominator without a Remainder, and so reduce the Fraction to its lowest terms at one Operation: But, if after all the Divisions are ended there remains one, then is such Fraction in its lowest terms already.

Exam. Reduce $\frac{216}{432}$ to its lowest Terms.

216)432(2
432
———
...
...

So

So that 216 is the common Meaſurer, and is the greateſt Number that will divide the Numerator and Denominator without a Remainder. See the work

216) $\frac{216}{432}$ ($\frac{1}{2}$ the Fraction ſought.

After this method you may try the Examples given, in the firſt Rule of this Reduction.

This Reduction is alſo very uſeful, for by it Fractions that are expreſs'd by great Numbers, are made to be expreſs'd by ſmaller, ſo that their true value is more eaſily and readily known.

Reduction the Fourth.

TEacheth how to bring Fractions of divers denominations into Fractions of one denomination, yet ſtill retaining the ſame value.

RULE.

Multiply all the Denominators continually one into another, and ſet the product thereof for a new Denominator; then multiply the Numerator of the firſt Fraction into all the Denominators, except its own, the product is the Numerator of the firſt Fraction, and muſt be

set over the Denominator before found. So likewise for the second Fraction you must multiply its Numerator into all the Denominators, except its own, the product is the Numerator of the second Fraction. *Proceed* thus with the rest of the Numerators, *that is*, Multiply each Numerator by all the Denominators, except its own, seting the several Products for new Numerators over the common Denominator first found, so shall these new Fractions be of one denomination, and equivalent to the former.

Example.

Reduce $\frac{2}{3}$ and $\frac{4}{7}$ and $\frac{5}{6}$ into one Denomination.

3 Denom. 1st.	2 Numer. 1st.
7 Denom. 2d.	7 Denom. 2d.
——	——
21	14
6 Denom. 3d.	6 Denom. 3d.
——	——
126 Common Den.	84 New Numer. 1st.
4 Numer. 2d.	5 Numer. 3d.
3 Denom. 1st.	7 Denom. 2d.
——	——
12	35
6 Denom. 3d,	3 Denom. 3d.
——	——
72 New Numer. 2d.	105 New Numer. 3d.

So

$$\text{So that} \left\{ \begin{array}{l} \frac{2}{3} = \frac{84}{126} \\ \frac{4}{7} = \frac{72}{126} \\ \frac{5}{6} = \frac{105}{126} \end{array} \right\}$$

More Example.

$$\text{Reduce} \left\{ \begin{array}{l} \frac{2}{5} \;\&\; \frac{1}{7} \;\&\; \frac{5}{6} \\ \frac{3}{7} \;\&\; \frac{1}{2} \;\&\; \frac{5}{8} \\ \frac{3}{2} \;\&\; \frac{2}{5} \;\&\; \frac{7}{9} \end{array} \right\} \text{into one denomination}$$

Note 1ſt.

If mixt Numbers are given thus to be reduc'd, reduce only the fractional parts.

Note 2d.

If compound Fractions are to be reduc'd to one Denomination, they muſt firſt be brought to ſimple ones by *Reduction* the Second.

This Reduction is alſo highly neceſſary, for before Fractions are brought to the ſame Denomination, they neither can be Added, nor Subſtracted.

Reduction the Fifth.

TEacheth how to alter, or change, a Fraction into another equal in value that ſhall have any aſſign'd Denominator.

RULE.

Multiply the Numerator of the Fraction by the aſſign'd Denominator, and divide the Product by the old Denominator, the Quotient is the Numerator to the intended Denominator.

Example.

Reduce $\frac{84}{126}$ into a Fraction, whoſe Denominator ſhall be 3.

84 Numer.
3 Denom. aſſign'd.

So that $\frac{84}{126}=\frac{2}{3}$.

126)252(2 the new Num.
252
. . .

More Examples.

Reduce $\left\{\begin{matrix}\frac{84}{210}\\ \frac{48}{112}\\ \frac{135}{360}\end{matrix}\right\}$ into a Fraction that ſhall have $\left\{\begin{matrix}5\\7\\8\end{matrix}\right\}$ for a Den.

Note, If a compound Fraction is thus to be reduc'd, then by *Reduction* 2d. turn it to a ſimple, and then work as the preceding Rule directs.

How to find the value of a Fraction.

This Reduction is the moſt uſeful of all others, for by it the value of any Fra-

Fraction is found in the known parts of Coyn, Weight, Time, *&c. And contrary, that is,* any part of Coyn, Weight, Time, *&c.* is turn'd into a Fraction; the method of doing which is as follows,

Multiply the Numerator by the parts of the next inferior Denominator, that are equal to an Unite of the ſame, that the Fraction gives the parts of; the Product divide by the Denominator, the Quote gives the value in the parts you multiply'd by: If after this Diviſion any thing remain, multiply it by the next inferior Denomination, dividing the Product by the Denominator, as before. *Thus proceed,* till you can bring it no lower, ſo will the ſeveral Quotients give the required value of the given Fraction.

Example 1ſt.

What's the $\frac{6}{8}$ *of a Shilling.*

```
  6
 12
----
8)72(9   So that 9 d. is the 6/8 of a Shill.
  72
----
  ..
```

But if when it be brought to the loweſt Terms any thing remain, place it

for a Numerator over the former Denominator.

Example 2d.

What's the $\frac{17}{19}$ of a Pound sterling.

17
20

19) 340 (17 Shill.   17 the 1st Remainder
19   12

150   19) 204 (10 Pence
133   19

17   14

14 the 2d. Remainder.
4

19) 56 (2 Far.
38

18 the 3d. Remainder.

So that $\frac{17}{19}$ of a Pound is 17 *s.* 10 *d.* $\frac{1}{2}$ and $\frac{18}{19}$ of a Fathing.

Example 3d.

What's the $\frac{5}{9}$ of a Pound weight, Averdupoize.

	8 Remain.
	16
5 Num.	
16	9)128(14 Drams.
	9
9)80(8 Oun.	
72	9)38
	36
8	
	2

So that $\frac{5}{9}$ of a Pound weight Averdupoize, is 8 Ounces 14 Drams $\frac{2}{9}$.

After this method may the value of any Fraction be found (whether it be of *Coyne*, *Weight*, *Time*, *Liquor Measure*, *Long Measure*, &c.) and given in known and familiar Terms, as in the second Example, where the value of $\frac{17}{19}$ of a Pound sterling was required. I answer, that it is 17 Shillings 10 Pence Half-penny, and $\frac{18}{19}$ of a Farthing. So likewise in the third Example, where the $\frac{5}{9}$ of a pound weight Averdupoize was required ; there I answer, that it was 8 Ounces, 14 Drams, and $\frac{2}{9}$ of a Dram.

How

How to turn any part of Coyn, Time, Weight, &c. into a Fraction.

THis is but the Converſe of the former, and therefore (from a little conſideration of what foregoes) may be eaſily effected: For if you do but conſider that 1 Shilling is the $\frac{1}{20}$ of a Pound ſterling, and 1 Penny the $\frac{1}{12}$ of a Shilling, and 1 Farthing the $\frac{1}{4}$ of a Penny: The Names of a Shilling, a Penny, and a Farthing, being only Denominations given them, for the Vulgar in our Nation to know them by, the more univerſal way of expreſſing them, being to call a Shilling the $\frac{1}{20}$ of a Pound, and a Penny the $\frac{1}{12}$ of a Shilling, alſo a Farthing the $\frac{1}{4}$ of a Penny: And this way of expreſſing them (ſuppoſing the value of the Pound known) would be intelligable to all Nations that have the knowledg of Numbers; ſo that if it were requir'd to know what part of a Shilling 9 *d.* is, I anſwer, that 'tis $\frac{9}{12}$, or when abreviated $\frac{3}{4}$. In like manner, if it were required to know what part of a pound 4 Shillings, it is evident that 'tis $\frac{4}{20}$ or $\frac{1}{5}$. But if it were requir'd to know what part of a Pound 1 Penny is, here I muſt

con-

consider that 1 Penny is the $\frac{1}{12}$ of $\frac{1}{20}$ of a Pound, and therefore if by *Reduction* the 2d. I reduce it to a simple Fraction, 'twill be $\frac{1}{240}$ of a pound Sterling, so a Farthing is $\frac{1}{4}$ of $\frac{1}{12}$ of $\frac{1}{20}$ of a pound, and therefore the $\frac{1}{960}$ of a pound: Lastly, if it be required to know what part of a Pound 13 *s.* 5 *d.* $\frac{1}{4}$ is, then reducing all into Farthings, it gives 645 ; and likewise finding the Farthings in one pound which is 960, and seting the former over the later fraction-wise gives $\frac{645}{960}$, the part of a pound that 13 *s.* 5 *d.* $\frac{1}{4}$ is.

After the same manner may any part of Weight, Time, Measure, &c. be expressed Fraction-wise.

Some Examples, with their Answers.

What's the $\frac{13}{14}$ of a Pound sterling.

Answer, 18 *s.* 6*d.* $\frac{3}{4}$ *q.* $\frac{3}{7}$.

What's the $\frac{6}{7}$ of a Guinea at 22 *s.*

Answer, 15 *s.* 8 *d.* $\frac{1}{2}$ *q.* $\frac{2}{7}$.

What's the $\frac{3}{8}$ of a Pistole at 17 *s.* 10 *d.*

Answer, 6*s.* 8 *d.* $\frac{1}{4}$.

What's the $\frac{2}{9}$ of a pound Weight Averdupoize. *Answer*, 3 *Oun.* 8 *Dr.* $\frac{8}{9}$.

What's the $\frac{6}{7}$ of a Year, at 365 days.

Answer, 312 *days*, 20 *hours*, 34 *min.* $\frac{2}{7}$.

What part of a Pound sterling is 2 *s.* 9*d.*

Answer, $\frac{33}{240}$.

What part of a pound Averdupoize is 11 Ounces 2 Drams $\frac{1}{4}$. *Answer* $\frac{713}{1024}$.

What part of a Year is 29 days, 14 hours. *Answer*, $\frac{710}{8760}$.

The reaſon of this Reduction is very evident, for in a given Fraction ſuppoſe $\frac{2}{3}$, ſuch proportion as the Denominator 3 has to its Numerator 2. ſuch proportion has any aſſign'd Denominator, ſuppoſe 6, to a Numerator correſponding to it, ſo that ſtating the Queſtion according to the Rule of Three, *viz.* If 3 give 2, what ſhall 6 give, and then as is directed multiplying the ſecond term 2, which is the Numerator, by the third term 6 the aſſign'd Denominator, dividing the product by the firſt term 3 the old Denominator, you get 4 for the Quotient, which is a new Numerator to the aſſign'd Denominator.

'Tis by this Reduction we turn a Vulgar Fraction to a Decimal, & contra, *alſo by it all the Decimal Tables are calculated, of which more ſhall be ſaid when I come to treat of Decimals.*

Addition of Vulgar Fractions.

IF the Fractions to be added have not like Denominators, they muſt be reduc'd to a common Denominator by Reduction

duction the 4th. Then add the Numerators together, and ſet the Summ for a Numerator over the common Denominator, ſo ſhall the Fraction thus found be the Summ of the given Fractions.

Example.

What's the Summ of $\frac{2}{3}$ and $\frac{5}{7}$.

Reduc'd to a common Denom. they ſtand thus, ———————— $\left\{ \begin{array}{l} \frac{14}{21} \\ \frac{15}{21} \end{array} \right.$

the Summ $\frac{29}{21}$ or $1.\frac{8}{21}$.

Obſerve if the Fraction that is the Summ of thoſe two given, happen to be an Improper Fraction, then by Reduction the 1ſt. Rule the 3d. reduce it into its equivalent whole, or mixt Number as in the laſt *Exam.*

More Examples.

What's the Summ of $\left\{ \begin{array}{l} \frac{2}{5} \\ \frac{4}{9} \end{array} \right.$

What's the Summ of $\left\{ \begin{array}{l} \frac{4}{7} \\ \frac{6}{9} \\ \frac{2}{5} \end{array} \right.$

Note 1.

If you are to add mixt Numbers, add only the fractional parts, being firſt reduc'd to a common Denominator by Reduction the 4th.

Note 2.

If compound Fractions are to be added one to another, or to ſimple Fractions, then ſuch Compound Fractions muſt be reduc'd to ſimple ones (by Reduction the 2d.) and thoſe again to one Denomination by Reduction the 4th.

Note 3.

If the Fractions to be added are not parts of the ſame whole, but the one parts of a Shilling, the other of a Pound, then (by Reduction the 5th.) they muſt be brought to one Name, or Denomination, *i. e.* both muſt be made parts of the ſame whole.

As for Example.

What's the Summ of $\frac{3}{5}$ of a Pound, and $\frac{2}{3}$ of a Shilling.

Here they are not only of different demominations, but parts of different Wholes, and therefore is more properly worded thus,

What's the Summ of $\frac{3}{5}$ and $\frac{2}{3}$ of $\frac{1}{20}$ of a Pound ſterling. *Anſwer*, $\frac{190}{300}$.

Subſtraction

Substraction of Vulgar Fractions.

THE Rules delivered for reducing and making Fractions fit for Addition, are in all respects and cases to be observ'd in Substraction; so that whether they are Mixt, Compound, or simple ones, they must be reduc'd to a common Denominator; then take the Numerator of the Substractor, or Fraction, to be Substracted, from the Numerator of the Substrahend (or Fraction from which we are to Substract) and set the remainder over the common Denominator, so is this new Fraction the remainder or difference sought.

Example.

From $1\frac{8}{21}$ or $\frac{22}{21}$ substract $\frac{2}{3}$.

Reduc'd to a common Denom. they stand thus, —— $\left\{\begin{array}{l}\frac{87}{63}\\ \frac{42}{63}\end{array}\right.$

Remainder $\frac{45}{63}$ or $\frac{5}{7}$.

More Examples.

From $\frac{28}{45}$ Substract $\frac{4}{9}$.

From $\frac{201}{315}$ Substract $\frac{3}{5}$.

Multiplication of Vulgar Fractions.

IF they be ſimple Fractions to be Multiply'd. Then Multiply the two Numerators, together, for a Numerator, and the two Denominators for a Denominator, ſo ſhall the Fraction formed by theſe two Numbers be the product Required.

Example.

Multiply $\frac{5}{8}$ by $\frac{4}{5}$.

$$\begin{array}{ll} 5 & \multirow{2}{*}{\Big\} \text{Numerators.}} \\ 4 & \\ \hline 20 & \end{array} \qquad \begin{array}{ll} 8 & \multirow{2}{*}{\Big\} \text{Denominators.}} \\ 5 & \\ \hline 40 & \end{array}$$

So that $\frac{20}{40}$ or $\frac{1}{2}$ is the Product requir'd.

More Examples

Multiply $\frac{7}{9}$ by $\frac{8}{11}$.

Multiply $\frac{5}{6}$ by $\frac{2}{7}$.

Multiply $\frac{4}{5}$ by $\frac{3}{4}$.

Note 1ſt.

If mixt Numbers are to be Multiply'd then before you can Multiply them they muſt be Reduc'd into Improper Fractions by Reduction the 1*ſt.* Rule the 1*ſt.* and 2*d.*

Note

Note 2d.

If they be Compound Fractions, Reduce them to ſimple ones.

Note 3d.

If a whole Number is to be Nultiplyed by a Fraction, then make the whole Number an Improper Fraction by ſetting one under it.

Diviſion of Vulgar Fractions.

IF the Fraction to be divided, and alſo the Fraction by which we divide, *that is*, Dividend and Diviſor, be both ſimple Fractions, then Multiply the Numerator of the Dividend by the Denominator of the Diviſor, and ſet the product for a Numerator; multiply alſo the Denominator of the Dividend, by the Numerator of the Diviſor, and take the product for a Denominator; the Fraction thus form'd is the Quotient.

Example.

Divide $\frac{20}{40}$ by $\frac{4}{5}$.

$\frac{4}{5}$) $\frac{20}{40}$ ($\frac{100}{160}$ or $\frac{5}{8}$ the Quotient.

More

More Examples.

Divide $\frac{56}{99}$ by $\frac{7}{9}$.
Divide $\frac{10}{42}$ by $\frac{2}{7}$.
Divide $\frac{12}{25}$ by $\frac{4}{5}$.

Note 1ſt.

If either Dividend, Diviſor or both, be whole or mixt Numbers, reduce them into Improper Fractions, by Reduction the 1ſt. Rule 1ſt. or 2d. and then divide according to the preceding Rule.

Note 2d.

If they be Compound Fractions reduce them to ſimple ones by Reduction the 2d.

The Rule of Three Direct in Fractions.

THE Directions given, both for ſtating and working Queſtions in the Rule of Three in whole Numbers, holds alſo in this of Fractions; ſo that having framed your Queſtion, as is there directed, 'tis but Multiplying the Fractions in the 2*d.* and 3*d.* place together, and divided the product by the firſt, according

to

to the preceding Rules given for Multiplying and dividing of Fractions, the Quotient is the Anſwer to the Queſtion.

Example.

If $\frac{2}{3}$ of a Yard of Cloath coſt $\frac{5}{7}$ of a Pound, what Coſt $\frac{7}{8}$ of a Yard at that Rate.

If $\frac{2}{3}$ ——————— $\frac{5}{7}$ ——————— $\frac{7}{8}$

$\frac{35}{56}$

$\frac{2}{3}$) $\frac{35}{56}$ ($\frac{105}{112}$ of a Pound for Anſwer.

Proof.

If $\frac{7}{8}$ ——————— $\frac{105}{112}$ ——————— $\frac{2}{3}$

$\frac{210}{336}$.

$\frac{7}{8}$) $\frac{210}{336}$ ($\frac{1680}{2352}$ or $\frac{5}{7}$.

More Examples.

If $\frac{8}{9}$ of a pound Troy coſt $\frac{5}{7}$ of a Guinea, at 22 s. What ſhall $\frac{9}{11}$ of a pound coſt. *Anſwer* $\frac{405}{616}$. or 14*s*. 5*d*. $\frac{1}{2}$ $\frac{22}{77}$.

If $\frac{4}{5}$ of a pound Troy coſt $\frac{3}{7}$ of a Noble, What will $\frac{14}{15}$ of a Noble buy. *Anſwer* . $\frac{392}{225}$ or 1 pound $\frac{167}{225}$.

If $\frac{7}{12}$ of an Hundred weight coſt 34 *s*. $\frac{2}{14}$, What will 19 Hundred weight $\frac{3}{4}$ coſt. *Anſwer* $\frac{453144}{392}$ or 1155$\frac{384}{392}$.

Note 1. If there be mixt Numbers, reduce them to Improper Fractions.

E *Note*

Note 2. If any of the given Fractions be Compound, that is Fractions of Fractions, they muſt be reduc'd to ſimple Fractions by Reduction the 2d.

The Rule of Three Reverſe in Fractions.

HEre alſo, as in that of whole Numbers, you are to Multiply the ſecond Term by the firſt, and divide the product by the third, the Quotient anſwers the Queſtion.

Example.

If $\frac{2}{5}$ of a Yard of Cloath that is a yard broad will make a Garment, How much of 3 Yards wide will make the ſaid Garment.

If 1 Yard ———— $\frac{2}{3}$ ———— 3

$\frac{1}{1}$ by $\frac{2}{3} = \frac{2}{3}$ $\quad \frac{3}{1}$) $\frac{2}{3}$ ($\frac{2}{9}$ for Anſwer.

Proof.

If 3 ———— $\frac{2}{9}$ ———— 1

$\frac{3}{1}$ by $\frac{2}{9} = \frac{6}{9}$

$\frac{1}{1}$) $\frac{6}{9}$ ($\frac{6}{9} = \frac{2}{3}$.

More Examples.

If 54 Men can build a House in 38 days $\frac{2}{3}$, How many Men will build the ſaid Houſe in 11 days $\frac{5}{6}$. *Anſwer* 176 Men $\frac{96}{213}$.

Lent

Lent my Friend $\frac{5}{8}$ of a pound for $\frac{2}{3}$ of a Year, How much ought he to lend me for 2 Years, to recompence my kindness. *Answer* $\frac{5}{24}$.

If when a Bushel of Wheat is sold for 5 shillings $\frac{2}{3}$, the penny white Loaf weighs 7 Ounces $\frac{3}{4}$, What must it weigh when the Bushel of Wheat cost 6 shillings $\frac{4}{7}$. *Answer*, 6 Ounces $\frac{377}{552}$.

A Collection of pleasant and useful Questions to Exercise the Rules of Vulgar Fractions,

By Reduction 5th.

WHat's the $\frac{2}{3}$ of 17 *s.* *Answer* 11 *s.* 4 *d.*

What's the $\frac{5}{7}$ of $\frac{2}{5}$ of a Guinea at 21 *s.* 2 *d.* *Answer*, 6 *s.* 00 *d.* $\frac{1}{2}$ *q.* $\frac{2}{7}$.

What's the $\frac{2}{3}$ of half a Mark. *Answer* 4 *s.* 5 *d.* $\frac{1}{4}$ *q.* $\frac{1}{3}$.

What's the $\frac{3}{5}$ of a Dollar at 4 *s.* 2 *d.* *Answer*, 2 *s.* 6 *d.*

What's the $\frac{7}{9}$ of 5 pounds. *Answer*, 3 *l.* 17 *s.* 9 *d.* $\frac{1}{4}$ *q.* $\frac{1}{3}$.

What's the $\frac{5}{8}$ of 13 *d.* $\frac{1}{2}$. *Answer* 8 *d.* $\frac{1}{4}$ *q.* $\frac{3}{4}$.

What's the $\frac{3}{7}$ of 8 Ounces $\frac{1}{2}$ Troy weight. *Answer* 3 *oz.* 12 *dwt.* 20 *gr.* $\frac{4}{7}$.

What's the $\frac{7}{9}$ of 15 days 3 hours. *Answer,* 11 *days* 18 *hours* 20 *minutes.*

By Reduction 2d. and 5th.

What's the $\frac{1}{2}$ of $\frac{2}{3}$ of a pistole at 18 *s.* *Answer,* 6 *s.*

What's the $\frac{5}{7}$ of $\frac{8}{9}$ of a Ducat at 7 *s.* 3 *d.* *Answer* 4 *s.* 7 *d.* 0 *q.* $\frac{20}{21}$.

What's the $\frac{3}{4}$ of $\frac{5}{6}$ of $\frac{7}{8}$ of a Guinea at 22 *s.* 2 *d.* *Answer,* 12 *s.* 1 *d.* $\frac{1}{4}$ *q.* $\frac{7}{8}$.

What's the $\frac{3}{8}$ of $\frac{1}{5}$ of 13 *l.* 4 *s.* 7 *d.* *Answer* 19 *s.* 10 *d.* 0 *q.* $\frac{1}{8}$.

What's the $\frac{2}{3}$ of $\frac{3}{4}$ of 5 Nobles. *Answer* 16 *s.* 8 *d.*

What's the $\frac{2}{5}$ of $\frac{1}{2}$ of $\frac{1}{4}$ of 1 *lib.* 3 *oz.* 2 *dwt.* Troy. *Answer,* 15 *dwt.* 2 *gr.* $\frac{2}{5}$.

Questions that Exercise most of the preceding Rules.

HOw much is $\frac{2}{3}$ of $\frac{5}{6}$ and $\frac{3}{4}$ of $\frac{1}{2}$ of a Jacobus at 25 *s.* *Answer* 1 *l.* 3 *s.* 3 *d.* 0 *q.* $\frac{2}{3}$.

How much is $\frac{1}{2}$ of $\frac{2}{3}$ and $\frac{7}{8}$ of $\frac{9}{10}$. of a Hundred weight Averdupoize. *Answer,* 1 *c.* 0 *q.* 13 *lib.* $\frac{8}{15}$.

What

What Quantity is that, from which if I take $3\frac{5}{7}$ the remainder shall be $1\frac{2}{5}$. *Answer*, $5\frac{4}{35}$.

What Quantity is that. from which if I take $\frac{1}{2}$ of $\frac{5}{9}$ the remainder shall be $\frac{2}{7}$ of 5. *Answer*, $1\frac{89}{126}$.

What's the difference betwixt $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$, and a whole Unite. *Answer*, $\frac{1}{12}$.

What Quantity is that, to which if I add $3\frac{5}{7}$ the Summ will be $5\frac{4}{35}$. *Answer* $1\frac{2}{5}$.

What Quantity is that, to which if I add $\frac{1}{5}$ of $\frac{2}{7}$, the Summ will be $1\frac{89}{126}$. *Answer* $\frac{1681}{4410}$

A person has $\frac{2}{7}$ and $\frac{1}{11}$ of a Mine, What part is that of the whole. *Answer*, $\frac{29}{77}$.

Another Miner has $\frac{3}{4}$ and $\frac{1}{7}$ and $\frac{1}{16}$ of a Mine, What share or part is that of the whole. *Answer* $\frac{107}{112}$

A Merchant has $\frac{3}{16}$ and $\frac{1}{2}$ of $\frac{1}{4}$ of a share in the Cargo of a ship, What part is that of the whole. *Answer* $\frac{40}{128}$. or $\frac{5}{16}$.

Another person has $\frac{1}{5}$ of $\frac{1}{8}$ and $\frac{1}{11}$ of $\frac{2}{3}$ of a ship, how much is that of the whole. *Answer*, $\frac{113}{1320}$.

Such Questions as the four last, are frequent among those that have parts in Mines, or Ships.

What's

What's the product of 3 *s.* 6 *d.* by 3 *s.* 6 *d.* *Here you are to consider that* 6 d. *is a part of a Shilling, and therefore the Question more rightly propos'd is,* What's the product of $3\frac{1}{2}$ by $3\frac{1}{2}$. *Answer* $\frac{49}{4}$ or $12\frac{1}{4}$ *that is* 12 *s.* 3 *d.*

Again, What's the product of 3 *l.* 19 *s.* 11 *d.* by 3 *l.* 19 *s.* 11 *d.* *Here (as before) consider,* that 19 *s.* 11 *d.* is $\frac{239}{240}$ *of a Pound sterling: And so the Question more rightly stated is,* What's the product of $3\frac{239}{240}$ by $3\frac{239}{240}$. *Answer,* $\frac{919681}{57600}$ or 15 *l.* & $\frac{55681}{57500}$ of a pound.

A certain Person having $\frac{3}{5}$ parts of a Coal Mine, sells $\frac{3}{4}$ of his share for 171 *l.* What is the whole Coal Mine worth. *Answer,* 380 *l.*

A Father dying left his Son a certain portion, of which he spent $\frac{1}{4}$; then of the rest he spent $\frac{1}{2}$, and then he had 252 *l.* What was the Portion the Father gave him. *Answer,* 672 *l.*

When the $\frac{2}{5}$ of $\frac{3}{4}$ of a ship is 147 *l.* 11 *s.* 3 *d.* How much is the whole. *Answer,* 491 *l.* 17 *s.* 6 *d.*

A Merchant bought $\frac{2}{3}$ of $\frac{3}{4}$ of a ship, another buys $\frac{3}{8}$ of $\frac{4}{5}$ of the same, the Question is, Whether their parts were equal, and if not, which had the biggest

geſt of the two. *Anſwer*, the firſt Merchant by $\frac{1}{5}$.

A younger Brother received 210 *l.* which was $\frac{3}{8}$ of $\frac{2}{3}$ of his Elder Brother's Portion: Now $3\frac{1}{2}$ times his Elder Brother's Portion was $1\frac{1}{3}$ time his Father's Eſtate, I demand what his Father's Eſtate was. *Anſwer*, 2205 *l.*

A Perſon making his Will gave to one Child $\frac{2}{5}$ of $\frac{3}{4}$ of his Eſtate, and to another $\frac{5}{6}$ of $\frac{2}{3}$ of his Eſtate, and when they counted their Portions, the one had 543 *l.* 1 *s.* 9 *d.* more than the other, I demand how much each had, and what was their Father's Eſtate. *Anſwer, The firſt had* 673 *l.* 10 *s.* 9 *d. and the ſecond* 1180 *l.* 12 *s.* 6 *d. and their Fathers Eſtate was* 2125 *l.* 2 *s.* 6 *d.*

A certain Perſon gave to one of his Children $\frac{3}{4}$ of $\frac{2}{5}$ of his Eſtate, and of the Remainder he gave another $\frac{3}{8}$ of $\frac{2}{3}$, and when they told their Money, the one had 173 *l.* 12 *s.* 4 *d.* more than the other, How much had each, and what was their Father's Eſtate. *Anſwer*, the firſt had 416 *l.* 13 *s.* 7 *d.* $\frac{1}{5}$. The Second 243 *l.* 1 *s.* 3 *d.* $\frac{1}{5}$. And their Father's Eſtate was 3388 *l.* 18 *s.* 8 *d.*

THE DOCTRINE OF Decimal Fractions.

WHAT a Fraction is, and how read, I have already declared in the Doctrine of Vulgar Fractions, and therefore I ſhall here only ſhew the different way of Noting theſe from that of Vulgar, with their great uſe in the Solution of ſeveral Arithmetick Queſtions.

A *Decimal Fraction* is that which hath for its Denominator an Unite, with a certain Number of Cyphers as 10, 100, 1000, 10000, &c. are all Denominators of Decimal Fractions.

Hence 'tis evident, that we divide the Unite into 10, 100, 1000, 10000, &c. equal parts. For dividing it firſt into 10 equal parts, and each of thoſe are again

again divided into 10 other equal parts; ſo that the Unite will then be divided into 100 equal parts; and if again we divide each of thoſe hundred equal parts into ten other equal parts, the Unite or Integer will be divided into 1000 equal parts; And ſo by Decimating the firſt, and Subdecimating the ſecond, we proceed *ad infinitum*.

Now becauſe all the Denominators of Decimal Fractions differ only in the Number of places, and not in the Figures, they being always an Unite with Cyphers, they may be expreſs'd without their Denominators with a point before them, as $\frac{6}{10}$ is thus expreſs'd .6, and $\frac{54}{100}$ thus .54, alſo $\frac{27}{1000}$ thus .027 And obſerve, that this point diſtinguiſhes them from whole Numbers.

Hence the Denominator of a Decimal Fraction is eaſily known by the places of the Numerator, the Denominator being always one place more, as .6 hath 10 for its Denominator, and .54 hath 100, and .027 hath 1000 for its Denominator, underſtand the like of any other.

The order of places in Decimals is from left to right, and therefore contrary to the order of places in a whole Num-

ber which is from right to left, as in this Decimal .548, here 5 is in the firſt place next the left hand, and ſignifies ſo many tenth parts of an Unite, and is therefore called *Primes* ; the 4 which is in the ſecond place, ſignifies ſo many hundred parts of an Unite, and is called *Seconds* ; the figure 8 which poſſeſſes the third place from the left hand, denotes ſo many thouſandth parts of an Unite, or Integer, and is called *Thirds*, and ſo on, as in the following Table.

The Notation Table for Decimals.

of Unity.					
Tenth parts	Hundr. parts	Thouſ. parts	X Thouſ. parts	C Thouſ. parts	Mill. parts
.3	5	7	9	8	4
Primes	Seconds	Thirds	Fourths	Fifths	Sixths

This Table consists only of a Decimal Fraction, against which above is set the Value of each place, and below its Name.

From a little consideration of what has been said 'tis evident, that Cyphers prefix'd on the right hand of the Numerator of a Decimal Fraction, do neither increase nor lessen its value. For .2 is of the same value with .20 or .200 &c. And therefore 'tis very easy reducing Decimal Fractions to a common Denominator, for 'tis but seting Cyphers on the right hand of the Numerator: As suppose .3 and .84 and .476 and .2356 were Decimal Fractions, and it was required to reduce them to one Denominator; here I consider that the Denominator of the greatest Decimal given is 10000, I therefore add so many Cyphers to each of the Numerators that will make each of their Denominators to consist of five places, so that the above proposed Decimals, when reduced, stand thus .3000 and .8400 and .4760 and .2356.

I have been as clear as possible in explaining the Notation of these Numbers, because of the great facility they bring with their practice in several Operations,

not only in Arithmetick, but in most other parts of the Mathematicks. For, had our first Institution of Dividing our Money, Weight, Measure, &c. been Decimally, we had never been troubled with so many Fractions, which cause such great tediousness in several Operations. And indeed the Art of Arithmetick would be taught with much more ease and expedition than now it is, in case such a Reformation should ever be brought to pass.

Reduction of Decimals.

WHat is here to be done is no more than what was shown in *Reduction* the *5th.* of Vulgar Fractions, only here I shall more largely comment upon what I there but hinted; and show in the first place how to reduce a Vulgar Fraction to a Decimal, and then how to find the Value of any Decimal in the known parts of Coin, Weight, Time, &c. and that with as much brevity and clearness as I can.

To Reduce a Vulgar Fraction to a Decimal.

THe proportion for reducing a Vulgar Fraction to a Decimal, is, *As the Denominator of the Vulgar Fraction to its Numerator, So is* 10, 100, 1000, &c. *or any assign'd Denominator, to its Numerator, that is to the Decimal required.*

Exam. 1. Suppose it was required to reduce $\frac{3}{4}$ to a Decimal Fraction, the Operation is as follows,

As 4 to 3 so is 10000

$$\begin{array}{l@{\qquad\qquad}r}
 & 10000 \\
 & 3 \\
\cline{2-2}
4)\,30000\,(7500 & 30000 \\
28\cdots & \\
\cline{1-1}
20 & \\
20 & \\
\cline{1-1}
.00 &
\end{array}$$

So that .7500 or .75 (for Cyphers on the right hand a Decimal Fraction neither increases nor diminishes its value) is the Decimal equivalent to $\frac{3}{4}$.

Note

Note.

From the preceding proportion 'tis evident, That if to the Numerator of any Vulgar Fraction you annex so many Cyphers, as you would have your Decimal to consist of places, and divide by the Denominator, the Quote gives the Decimal required.

Exam. 2. Reduce $\frac{15}{19}$ to a Decimal of five places.

To 15 the Numerator of the given Vulgar Fraction I annex five Cyphers, it makes 1500000, this I divide by 19 the Denominator, the Quote is the Decimal required. See the following Operation.

```
19) 1500000 (78947
    133 ....
    ----
     170
     152
     ----
      180
      171
      ----
        90
        76
       ----
       140
       133
       ----
         7
       ----
```

So

So that the Decimal equal to the given Vulgar Fraction is .78947, which because of the remainder, is not exactly the truth, yet 'tis so near, that it wants not $\frac{1}{100000}$ part of an Unite of the truth, and if you proceed farther to make the Decimal consist of six places, it will be .789473, and then it will not want $\frac{1}{1000000}$ part of an Unite of the truth; for if the Decimal be made .789474, it would exceed the true value.

And thus by Increasing the Number of places in the Decimal you may at last come infinitely near, tho' never to the truth it self.

Exam. 3. Reduce $\frac{1}{32}$ into a Decimal of five places.

```
32)100000(3125
   96...
   ---
    40
    32
    ---
     80
     64
     ---
     160
     160
     ---
       .
```

Here

Here (because the Decimal is required to five places) I add five Cyphers to 1 the Numerator of the given Fraction, and then divide by 32 the Denominator, the Quote gives 3125 for the Decimal sought.

But here Note, that because I annex'd five Cyphers to 1 the given Numerator, and there arises but four figures in the Quote, I must supply such defect by prefixing as many Cyphers on the left hand of the first figure in the Quote as there wants places, as in the preceding Example. where the Quote consisted but of four figures or places, here I annex a Cypher on the left hand of 3 the first figure in the Quote, and then it becomes .03125 which is the true Decimal required.

To Reduce the known parts of Money, Weight, Time, &c. *to a Decimal Fraction.*

FRom what precedes, 'tis evident how the known parts of Money, Weight, Time, *&c.* may be turn'd into a Decimal of the same Value, or Infinitely near it, for if in Money, a Pound Sterling be an Integer, whatsoever is less

than

than a Pound, is either a part or parts of the ſame; and when you know what part or parts thereof it is, you may eaſily Reduce it to a Decimal of the ſame Value, from what was taught in the laſt.

Exam. What's the Decimal of 9 *s*. That is Reduce $\frac{9}{20}$ into a Decimal conſiſting of two places.

$$\begin{array}{r} 20)\ 900\ (45 \\ 80 \\ \hline 100 \\ 100 \\ \hline 000 \\ \hline \end{array}$$

Here working according to what has been before directed, I find the Decimal of 9 *s*, to be .45

So if I would know the Decimal of 9 *d*. here I conſider that 9 *d*. is $\frac{9}{12}$ of $\frac{1}{20}$ of a Pound or $\frac{9}{240}$.

Working therefore according to the preceding Rule, I find the equivalent Decimal to be .0375.

Again, if I would know the Decimal of 3 Farthings, here I muſt conſider that 3 Farthings is the $\frac{3}{4}$ of $\frac{1}{12}$ of $\frac{1}{20}$ or $\frac{3}{960}$ of a pound, and therefore working as before, I find the Decimal to be .0031 near.

Laſtly, if it were requir'd to find the Decimal of 7 *l.* 08 *s.* $\frac{3}{4}$ that is 371 Farthings, or $\frac{371}{960}$ here repeating the like operation, I find the Equivalent Decimal to be 3864, the like is to be underſtood in reduceing to Decimals, the known parts of Weight, Time, Meaſure, Motion, &c.

To find the Value of a Decimal Fraction in the known parts of Money, Weight, Time, &c.

THis is but the Converſe of the former; and therefore the Rule for finding the Value of a Decimal is grounded upon the ſame reaſon as that of turning any part of Coyne, &c. to a Decimal.

For 'twill hold *as the Decimal Denominator is to its Numerator, So is the parts in the next Inferior Denomination to the Numerator, or Number of ſuch parts contain'd in the Decimal.*

And hence comes this Rule. Multiply the given Decimal by the parts of the next inferior Denomination, that are equal to the Integer the Decimal gives the parts of, and from the product cut of

of so many figures towards the right hand as there are places in the given Decimal, the remaining figures on the left side are the value of the said Decimal in the next inferior Denomination: If any thing remain, it is the Decimal of an Integer in the Denomination last found, and may be reduced as low as you please by the same Rule, and after the same manner, as it was in *Reduct. 5th.* of Vulgar Fractions.

Exam. How much is .3765 of a pound Sterling. I say,

As 10000 to 3765, So is 20 to 7 *s.* 6 *d.* ($\frac{1}{4}$ 44.

```
             20
          ------
10000)   7|5300
See the work.
          ------
         6|3600
             4
          ------
         1|4400
          ------
```

So that from the preceding Work I find the true Value of this Decimal of a Pound sterling .3765 to be 7 *s.* 6 *d.* $\frac{1}{4}$.44 After a like process may the Value of any Decimal of Weight, Time, Measure, &c. be found.

Some more Examples, I might here have added, but I think the Method is ſo plain, that it will be needleſs ; I ſhall therefore forbear, and in the room thereof ſhow you a brief, and practical Rule for finding the value of any Decimal of a Pound Sterling, as ſoon as ever you hear it nam'd,

The Rule is

The figure in the firſt place, or place of Primes, being doubled gives you the Number of Shillings, and if the Figure in the ſecond place be 5, or above it, take one Shilling for the five, and add to the former Number of Shillings, found by doubling, then for that which remains above 5, with the Figure in the third place, count ſo many Farthings leſs by 1, that thoſe two Figures make, being ſet in a Numeral Order, or if the Figure in the ſecond place be under 5, then reckon ſo many Farthings wanting 1, as that and the Figure in the third place of the Decimal make in Number. An Example or two will make it plain.

Exam. 1. What's the .375 of a pound Sterling.

Here I double 3, which ſtands in the place of Primes, and that gives 6 *s*. then because

because the next Figure (7) is above 5, I add one Shilling to the 6 before found, and it makes 7 *s.* then the 2 which is left of the 7, with the 5 in the place of thirds, makes 25, which being lessen'd by 1, gives 24 Farthings, so that the value of . 375 is 7 *s.* 6 *d.*

Exam. 2.

What's the Decimal of .719.

Here the first figure 7 doubled gives 14 for the Number of Shillings, as before, and for the other 19 that remains I account 18 Farthings, which is 4 *d* $\frac{1}{2}$. so that the value of the Decimal .719 is 14 *s.* 4 *d.* $\frac{1}{2}$.

More Examples might here be given, but I think these are sufficient to illustrate this practical way of finding the valve of the Decimal of a pound Sterling.

I shall conclude this with the Insertion of the Decimal Table, for finding the value of any Decimal of a pound Sterling, omitting those of *Weight*, *Measure*, *Time*, *&c.* because of their being so seldom used, and if required, so easily Calculated from the aforementioned proportion, and likewise for their frequency in Books of this Nature.

A TABLE, showing the Decimal of any part of a Pound sterling, & contra.

Shillings.	19	.95	Pence.	11	.04584
	18	.9		10	.04166
	17	.85		9	.0375
	16	.8		8	.03333
	15	.75		7	.02917
	14	.7		6	.025
	13	.65		5	.02083
	12	.6		4	.01667
	11	.55		3	.0125
	10	.5		2	.0083
	9	.45		1	.00417
	8	.4	Farth.	3	.00312
	7	.35		2	.00208
	6	.3		1	.00104
	5	.25			
	4	.2			
	3	.15			
	2	.1			
	1	.05			

The Use of the Table.

The method of making this Table is evident from what procedes, and its use almost as apparent. Let the Decimal of 13 *s.* 7 *d.* ½. be required, Seek in the Table first for the Decimal of 13 *s.* which is .65 next for the Decimal of 7 *d.* which

is

is .02917, and laſtly for the Decimal of $\frac{1}{2}$, which is .00208; I ſet theſe Decimals in the order following, and add them together.

13 *s.*	65
7 *d.*	02917
2 *q.*	00208
13 *s.* 7 *d.* 2 *q.*	68125

By which you ſee the Decimal of 13 *s.* 7 *d.* $\frac{1}{2}$ is .68125. In like manner may the Decimal of any other Sum be found, as alſo the Sum belonging to any given Decimal.

Addition of Decimals.

AS to the manner of adding, 'tis the the ſame as in common Addition, the buſineſs being only to ſee that they are rightly plac'd, according to the manner of their Notation, which thing is eaſily effected, by ſeting the point prefixt to them under each other; for then the reſt of the places will fall right, whether they be whole Numbers and Decimals, or all Decimals.

Some

Some Examples.

	pts	*In. pts*	*In. pts*
	.427	2.43	27.67
	.3583	5.67	615.369
	.67526	4.38	2.19
Sum	1.46056	12.48	645.229

Here you see in all these cases that Primes stands under Primes, Seconds under Seconds, &c. And where Integers are joyn'd with Decimals, there unites, stands under unites, and Tens under Tens, &c. In which Examples 'tis very plain, that the method of adding is put as it was in whole Numbers, only here you are to make the summ consist of no more Decimal places, then is in the greatest part of it. As in our first Example, the Summ consisted of six places or Figures, and the greatest part but of five, I therefore cut off five Figures in the Sum, toward the right hand for the Decimal parts, the remainder on the left are Integers.

Note, That in this, and the following Rule, the Decimals given to be added, or Sub-

Substracted, must be parts of the same whole.

More Examples,

What's the Sume of 29 & 3.007 & .94 & 89.76. *Answer.*

What's the Sume of 3.87 & 486 & .4 & .025. *Answer.*

What's the Sume of 59.4 & 8.796 & 472.6 & .142. *Answer.*

Note, that *In.* over the preceding and following Sums stands for *Integer*, and *pts.* for *Parts.*

Substraction of Decimals.

THe Operation here is in all respects like to that in Vulgar Substraction, the main thing (as in the last) being only to see that they are rightly placed, which is done by the direction given in the foregoing Rule of Addition.

Some Examples

	.456	2.352	58.1
	.287	.87	.296
Rema.	.169	1.482	57.804

Here you ſee we Subſtract as in common Subſtraction, only obſerve, that where the Decimals have not an equal Number of places, the vacances are ſupplied with Ciphers, or are underſtood ſo to be, eſpecially in the upper Number.

More Examples.

From 15 ſubſtract 7.8 *Anſw.* 7.2
From 1 ſubſtract .9872 *Anſw.* .0128
From 58.6 ſubſtract 3.98625. *Anſw.* 54.61375

Multiplication of Decimals.

IN Multiplication of Decimals, both the manner of placing and multiplying is in all reſpects and caſes, the ſame with that of placing and multiplying whole Numbers, the buſineſs here being only

only to find the value of the Product after the Operation is ended, which to do take this general

Rule.

See how many Decimal places there are in the Multiplicand and Multiplior, and from the Product toward the right hand cut off ſo many as are in both theſe, ſo ſhall the Figures on the right hand of the point be Decimal places, and thoſe on the left ſide Integers.

	5.46	21,67	.67.23
	14	2.3	.63
	2184	6531	020169
	546	4334	40338
Prod.	7644	49.841	.423549

But if when the Multiplication is ended, there ariſe not ſo many Figures in the Product, as ought to be cut off, then is ſuch defect to be ſupply'd, by annexing as many Cyphers on the Left Hand thereof, as there wants places; with a point before them, and you have the true value of the product; See the following *Examples.*

	.158	.227
	.6	.02
Prod.	948	454
True Prod.	0948	.0454

The consideration of this practice will be of some help to you, in finding the true value of the Quote in Division.

More Examples.

Mult.	400000	.000001	232
By	.000003	900	438
Prod.	1.200000	.000900	101.616

Of Contraction in Multiplication of mixt Numbers.

THere is in this kind of Multiplication, a certain way of Contraction, by which you may get the product, to as few, or many places as you please, without the tedious Multiplication of the whole; the Method of which is as follows.

As Suppose 9.58 was to be Multiplyed by 8.79, here 'tis evident the decimal will

will consist of 4 places, and only two would be sufficient.

Set down the bigger of the two Quantities for the Multiplicand, and then set the place of Unites in the Multiplior, under that place of parts in the Multiplicand, you would have in the product, and then invert the Order of all the other places in the Multiplior, *that is*, set the place of Tenns, where Primes should be, and the place of Primes where Tenns should be, and so on with the invertion of the rest; then let each Figure of the Multiplior, Multiply that of the Multiplicand, which is just over, Remembring to add, what would have been brought thither from the following places; then add up all together, and from the Summ cut of two Figures (in this Example) next the Right Hand, and you have your desire, all which by the following Examples, compar'd with this direction will plainly appear.

Exam-

Example 1st.

By the common way		By Contraction
9.58	Multiplicand	9.58
8.79	Multiplior	97.8
84.2082		7664
		670
		86
		Prod. 84.20

Example 2d.

By the Common way		By Contraction
342.6894	Multiplicand	3426894
52.678	Multiplior	876.25
18052.1922132		17134470
		685378
		205613
		23988
		2741
		Prod. 18052.190

This laſt was requir'd to three places, where you ſee they are ſeperated by a point

point toward the Right Hand, being 190, but ſhould have been 192; which ſmall Errour is caus'd by the want of the Carriage from the next row, and therefore if you would have it exactly to 3 places, eſpecially in great Summs, you ought to do it to four.

Diviſion of Decimals.

THE manner of working Decimal Diviſion, is in every thing like to that of Common Diviſion, and therefore no regard as to their place and Nature is here to be had, any more than what was in Diviſion of whole Numbers; the Miſtery of this lying firſt in their preparation, when need requires. *Secondly*, In finding the true Value of that Quote after the Diviſion is ended.

Firſt, Therefore when it happens, that the Diviſor has more places than the Dividend, you muſt put to the Right Hand of the dividend, (whether it be a whole Number, mixt or Decimal Fraction) a certain Number of Ciphers at pleaſure, by which it is made fit for Operation.

As ſuppoſe 14 was to be divided by 361, 'tis evident here is an abſolute Neceſſity of prefixing Ciphers to 14 the Dividend, before you can divide by 361 the Diviſor.

The Dividend being thus prepared take Notice, that there muſt be as many decimal places in the Diviſor and Quotient as are in the Dividend; for the dividend is in effect the product, and the Diviſor and Quotient the Multiplicand and Multiplior. And therefore for the finding the value of the Quotient this is the

Rule.

Look how many Decimal places are in the Dividend, more than in the Diviſor, for ſo many Decimal places will there be in the Quotient.

And here Note, that you muſt be ſure to make the Dividend conſiſt of more places than the Diviſor, if it doth not ſo already, which is eaſily done, by ading Ciphers.

Exam-

Example.

.56) 24 (83) .35 (

```
                          83)350000(4216
56)24.0000(4285              332...
   224...                    ---
   ---                        180
    160                       166
    112                       ---
    ---                        140
     480                        83
     448                        ---
     ---                        570
      320                       498
      280                       ---
      ---                        82
       40                       ---
      ---
```

Having annexed 4 Ciphers to each of the Dividends, the first Dividend being an Integer, consists only of the 4 Decimals added; but the later being a Decimal, is made to consist of six Decimals by the 4 Ciphers that was added; they being thus prepared, and the work of Division over, you see the Quote consists; of 4 places; now considering how many

Decimal places there is in each of thoſe Quotes more than in their proper Dividends, and you ſhall find that in the firſt Quote, there ought to be two places of Decimals, and in the ſecond ſix of the like places, which becauſe there is but four, I prefix two Ciphers on the Left Hand thereof, which makes it .004216.

Some more Examples.

84)3.5(54)1.5(.9).004(.63)1(

prepar'd	3.50000	prepar'd	1.50000
true Quote	.04166	true Quote	.2777
prepar'd	.004000	prepar'd	10000
true Quote	.00444	true Quote	.158

I have to theſe 4 Examples, ſet only the Dividends prepar'd with their Quotients truly Valued, the conſideration of which, with the preceding direction, I hope will be a ſufficient light in all other Caſes that can happen.

Of

Of the Use of Decimals.

TO ſhow the uſe of theſe Numbers in all Solutions, where they might be applied in Expediting an Operation, would be endleſs, they being of great uſe in moſt parts of the Mathematicks; but particularly, and principally in Gauging, Surveying, and Meaſuring, Calculating the Tables of Intereſt, raiſing of Logarithmes; as may be ſeen in moſt Books, that have Writ of theſe Subjects, I ſhall therefore forbear giving Examples of uſeing them in any of theſe parts, Except I had Treated diſtinctly of each of them; and ſhall cloſe rhis Paragraph with the Collection of a few eaſy Queſtions, which are very ſpeedily and eaſy ſolv'd by theſe Numbers.

By Multiplication.

IN 756 Piſtoles, at 18*s.* each, How many Pounds Sterling. *Anſw.* 680*l.* 08*s.*

In 439 Guinea's, at 22*s.* 6*d.* each, How many Pounds ſterling. *Anſw.* 493*l.* 17*s.* 6*d.*

If I ſpend 4 *s.* 6 *d.* *per* Day, How much is that for one Year. *Anſw.* 82 *l.* 2 *s.* 6 *d.*

If a yard of Cloth is worth 6 *s.* 9 *d.* What comes 59 Yards to at that Rate. *Anſw.* 19 *l.* 18 *s.* 3 *d.*

If a piece of Paving be 34 foot, 6 inches long, and 24 foot, 9 inches broad, What's the Content in ſquare feet. *Anſw.* 853 foot .875

If one Man's ſhare in the Cargo of a ſhip come to 38 *l.* 14 *s.* What was the whole worth, ſuppoſing there was 158 Men in the ſhip. *Anſw.* 6114 *l.* 12 *s.*

If the Intereſt of 500 *l.* for one Day is 2 *s.* 3 *d.* What's that for a Year. *Anſw.* 41 *l.* 1 *s.* 3 *d.*

By Diviſion.

IN 680 *l.* 8 *s.* How many Piſtoles, at 18 *s.* each. *Anſw.* 756.

In 493 *l.* 17 *s.* 6 *d.* How many Guinea's at 22 *s.* each. *Anſw.* 439.

If I ſpend 82 *l.* 2 *s.* 6 *d.* in one year. What is that for one day. *Anſw.* 4 *s.* 6 *d.*

If 59 Yards of Cloth coſt 19 *l.* 18 *s.* 3 *d.* What Coſt one Yard. *Anſw.* 6 *s.* 9 *d.*

If

If the Content of a piece of Paving be 853 Foot .875 and the length be 34 foot 6 Inches. What's the true breadth. *Answ.* 24 Foot 9 Inches.

If the whole Cargo of a ship be 6114 *l.* 12 *s.* and there be 158 men in the ship. What comes each man's share. *Answ.* 38 *l.* 14 *s.*

If the Interest of 500 *l.* for a Year is 41 *l.* 1 *s.* 3 *d.* What is that for one day. *Answ.* 2 *s.* 3 *d.*

I conceive it needless to meddle with the Rule of Three, it being in all kinds and respects performed like that in Vulgar Fractions; I shall therefore leave the Exercise of Questions of this nature to the Ingenious.

A Specimen of the Demonstration of the Operations of Vulgar and Decimal Fractions.

I Shall first begin with that of Vulgar Fractions, and in order to the more clear apprehending thereof, I must make a short Repetition of what has been already declared in the first page, *viz.*

That

That a Fraction is a part or parts of ſome diviſible Integer, and is repreſented by two Numbers, the one above the other beneath a Line thus $\frac{2}{5}$.

The Number placed beneath the Line is called the Denominator, and ſhows what parts the Unite is divided into.

The Number placed above the Line is called the Numerator, and ſhows how many of thoſe parts are to be taken in the Fraction.

As the Fraction $\frac{2}{5}$ denotes two ſuch parts as the Integer contains 5.

From this method of expreſſing Fractions it follows.

That every Fraction is to its whole an Unite, as the Numerator is to the Denominator, and conſequently.

Firſt, That if the Numerator be $\left\{\begin{array}{l}\text{greater}\\ \text{equal}\\ \text{leſs}\end{array}\right.$ than the Denominator, the Fraction is accordingly greater equal or leſs than its whole an Unite. The firſt and ſecond of theſe kinds are called Improper Fractions, the laſt are termed Proper.

Secondly, That Fractions are not to be eſtimated by the greatneſs of their Numbers by which they are expreſs'd, but by the proportion the Numerators bear to the Denominators.

Thirdly,

Thirdly, That Fractions, whoſe Numerators to their Denominators bear the ſame proportion, are equal as $\frac{1}{2}\cdot\frac{3}{6}\cdot\frac{10}{20}$.

Fourthly, That every Fraction is the Quotient of the Numerator divided by the Denominator.

This being granted, I propoſe the following *Lemma*.

Lemma.

If a Number multiply two Numbers, their Products are in ſuch proportion to each other, as the Numbers multiplied are to themſelves.

For 3 multiplying $\left\{\begin{matrix}6\\8\end{matrix}\right\}$ produceth $\left\{\begin{matrix}18\\24\end{matrix}\right.$ then I ſay that 6 : 8 : : 18 : 24. Which thing is evident from the common Notion of Multiplication. For 1 : 3 : : $\left\{\begin{matrix}6:18\\8:24\end{matrix}\right\}$ and therefore 6 : 18 : : 8 : 24 by the 11th. of the Fifth of *Euclid*.

But by *alternation* 6 : 8 : : 18 : 24, which was to be proved.

Having laid down this as a foundation, I ſhall proceed to a Demonſtration of each particular Operation.

Re-

Reduction the First.

This is so clear from the nature and manner of expressing a Fraction, as also from the first consequent, that it needs no farther Demonstration.

Reduction the Second.

The Proof of this is a consequent from that of Multiplication, and therefore I refer it to that place.

Reduction the Third.

This teaches to abbreviate a Fraction, by dividing both Numerator and Denominator by any Number that will divide both without a remainder.

As suppose $\frac{6}{8}$ is given to be reduced to its lowest Terms, here dividing 6 by 2, and 8 by 2, there arises $\frac{3}{4}$; now since 3 and 4 multiplied by 2 produces the same Numbers, *viz.* $\frac{6}{8}$. therefore $3 : 4 :: 6 : 8$ and therefore the Fraction $\frac{3}{4}$ is equal to $\frac{6}{8}$ by the *Lemma*, and third Consequent.

Re-

Reduction the Fourth.

This teaches to reduce Fractions of divers Denominations into one Denomition, having the same value, for doing of which the

Rule is

Multiply all the Denominators for a common Denominator, then multiply each Numerator into all the Denominators, except its own, for a new Numerator.

As suppose $\frac{3}{8}$ and $\frac{2}{7}$ were given to be so reduced.

From the Operation according to the Rule they will stand thus $\frac{3 \times 7}{8 \times 7}$ and $\frac{8 \times 2}{8 \times 7}$ that is $\frac{21}{56}$ and $\frac{16}{56}$, which Fractions are by the aforesaid *Lemma* and third Consequent equal to those given.

Again, Suppose $\frac{2}{3} \cdot \frac{3}{4} \cdot \frac{4}{5}$ were given thus to be reduced. The Fractions $\frac{2 \times 4 \times 5}{3 \times 4 \times 5} \cdot \frac{3 \times 3 \times 5}{3 \times 4 \times 5} \cdot \frac{3 \times 4 \times 4}{3 \times 4 \times 5}$ that is $\frac{40}{60}$ $\frac{45}{60}$ $\frac{48}{60}$ are evidently equal to the Fractions proposed by the said *Lemma*, and third Consequent.

Reduction the Fifth.

This is proved in the Reduction of a Vulgar Fraction to a Decimal.

Of Addition and Substraction of Fractions.

THE Fractions whose Summ or Difference is required must be reduced to equal Fractions, having the same Denomination. And then according to the Rule the $\left\{\begin{array}{c}\text{Summ}\\ \text{Difference}\end{array}\right\}$ of the Numerators placed over the common Denominator is the $\left\{\begin{array}{c}\text{Summ}\\ \text{Difference}\end{array}\right\}$ of the Fractions requir'd.

Exam. What's the Summ and Difference of $\frac{3}{8}$ and $\frac{2}{7}$.

The Fractions reduced to others equal to them, and of the same Denomination are $\frac{21}{56}$ and $\frac{16}{56}$ consequently $\frac{21 \pm 16}{56}$ is the $\left\{\begin{array}{c}\text{Summ}\\ \text{Difference}\end{array}\right\}$ of the Fractions, that is the Summ is $\frac{37}{56}$, the Difference $\frac{5}{56}$, which was required.

Of Multiplication of Fractions.

For finding the product of any two Fractions, this is the

Rule.

Rule.

Multiply the Numerators together for a new Numerator, and the Denominators together for a new Denominator, the Fraction thus produced is the product.

Exam. Suppoſe $\frac{3}{4}$ was given to be Multiplied by $\frac{2}{3}$, the Product is

$$\frac{2 \times 3}{3 \times 4} = \frac{6}{12} = \frac{1}{2}.$$

The reaſon of which is evident, for by the 4*th.* Conſequent I conſider theſe Fractions as the Quotients of their reſpective Numerators divided by their Denominators, and ſo if I multiply $\frac{3}{4}$ by 2 it gives $\frac{2 \times 3}{4}$ for to double any Quotient, is to double the Dividend: But now ſince I have multiplied by 2, when I ought to have multiplied by $\frac{1}{3}$ of 2, therefore $\frac{1}{3}$ of this product is the truth, which I effect by tripling the diviſor 4, Therefore $\frac{2 \times 3}{3 \times 4}$ ($= \frac{1}{2}$) is the product of $\frac{2}{3}$ by $\frac{3}{4}$.

And here you may take notice, that the product of any Quantity multiplied by a Fraction is always leſs than the Quantity ſo multiplied.

The reaſon of which follows from the Principle of Common Multiplication, which is, that every Product contains the Dividend ſo often as the Diviſor contains 1 or Unity. If therefore the Multiplior be leſs than 1 or Unity, the Product will be leſs than the Multiplicand; For according to this Principle, the Product muſt not contain the Multiplicand once, becauſe the Multiplior doth not Unity.

Hence the Product of two Fractions is evidently leſs than either of them.

And hence alſo the reaſon of reducing Compound Fractions to Simple ones is very clear; for to take the $\frac{2}{3}$ of $\frac{3}{4}$, is no more than to Multiply thoſe two Fractions together.

Of Diviſion.

For working of Diviſion the

Rule is

Multiplply the Denominator of the Diviſor into the Numerator of the Dividend for a new Numerator, and the Numerator of the Diviſor into the Denominator of the Dividend for a new Denominator, the Fraction thus formed ſhall be the Quotient.

Suppoſe

Suppose $\frac{2}{3}$ to be divided by $\frac{3}{4}$.

$$\tfrac{3}{4})\tfrac{2}{3}\left(\frac{4 \times 2}{3 \times 3}\right) = \tfrac{8}{9} \text{ the Quotient.}$$

Here, as before, I consider the Fractions as Quotients: So that if the Example had been, How many $\frac{1}{4}$ is in $\frac{2}{3}$; the Answer would be $\frac{4 \times 2}{3}$, for that is only Quadrupling the Numerator. But since my Divisor is $\frac{3}{4}$, 'tis evident the former Quote is 3 times too much; wherefore I take $\frac{1}{3}$ of it by tripling the Divisor, and then it stands as above.

Of Decimal Fractions.

DEcimal Fractions (as I have elsewhere noted) are only Fractions, whose Denominators are an Unite with Cyphers, as 10, 100, 1000, &c. And are conveniently written without their Denominators; for if the Numerators consists of places equal in Number to the Cyphers in the Denominator, then prefix a point before the Numerator, and

om:t

omit the Denominator ; but if the Denominator do not conſiſt of as many places as there are Cyphers in the Denominator, then you muſt ſupply that defect by puting Cyphers before the ſignificant figures of ſuch Numerator, with a point on the left hand of ſuch Cypher, or Cyphers,

As $\frac{3}{10}$ $\frac{78}{100}$ $\frac{86}{1000}$ $\frac{54}{10000}$ are

thus expreſs'd .3 .78 .086. .0054

To reduce a Vulgar Fraction to a Decimal.

SAy, As the Denominator of the Fraction propoſed, is to its Numerator, ſo is 10, 100, 1000 &c. that is, an Unite with as many Cyphers as I intend my Decimal ſhall have places, to the Numerator of a Decimal equal to it.

Exam.

Example.

Reduce $\frac{3}{4}$ into a Decimal of two places

$$4 : 3 :: 100$$
$$3$$

$$4)300(75$$
$$20$$

So that $\frac{75}{100}$ or .75 is equal to the Fraction propoſed by the third Conſequent.

The 5th. Reduction is here prov'd, this being the ſame with that, only then we knew not the name of Decimals, for ſuch Fractions as had 10, 100 &c. for the Denominator.

Theorem.

The Decimal Fraction .234 is equal to $\frac{2}{10} + \frac{3}{100} + \frac{4}{1000}$ Alſo the mixt Quantity 3.856 is equal to $8 + \frac{8}{10} + \frac{5}{100} + \frac{6}{1000}$.

For $\frac{2}{10} = \frac{200}{1000}$ & $\frac{3}{100} = \frac{30}{1000}$ & $\frac{4}{1000} = \frac{4}{1000}$ As alſo $3 = \frac{3000}{1000}$ & $\frac{8}{10} = \frac{800}{1000}$ & $\frac{5}{100} = \frac{50}{1000}$ & $\frac{6}{1000} = \frac{6}{1000}$. But $\frac{2}{1000} + \frac{3}{1000} + \frac{4}{1000} =$ the Summ $\frac{234}{1000} = .234$ Alſo $\frac{3000}{1000} + \frac{8}{1000} + \frac{5}{1000} + \frac{6}{1000} =$ the Summ $3.\frac{856}{1000} = 3.856$ by the third Conſequent.

Hence the firſt place after the Point in Decimals is the place of Tenths, the ſecond of Hundredths, the third of Thouſandths, &c. decreaſing in a Subdecuple proportion, from Unity towards the right hand, as whole Numbers increaſe from Unity towards the left in a Decuple proportion. *Hence 'tis eaſie*

To Add or Subſtract Decimals.

The Rule.

Place Unites under Unites, Tenths under Tenths, Hundredths under Hundredths, *&c.* Then add or ſubſtract, as if they were whole Numbers.

Exam.

Exam. in Add.

6. 4	that is	6. 400
298. 23		298. 230
43. 171		43. 171
347. 801 Sum		347. 801 Sum

Exam. in Sub.

From 5. 46	that is	From 5. 46
Take 2. 9		Take 2. 90
2. 56 remaind.		2. 56 rem.

Multiplication of Decimals.

MUltiply Integers and Decimals together, as if all were Integers, and then cut off as many places from the Product towards your right hand, or Decimals, as is the Number of Decimal places in both Multiplicand and Multiplior.

Example.

$$\begin{array}{lr@{\qquad}lr}
\text{Multiply} & 32.4 & & .0023 \\
\text{by} & 7.6 & & .09 \\
\hline
& 1944 & \text{Prod.} & .000207 \\
& 2268 & & \\
\hline
\text{Prod.} & 246.24 & & \\
\hline
\end{array}$$

Here 32.5 is $\frac{324}{10}$ and 7.6 is $\frac{76}{10}$, which two Fractions multiplied by the Rule given for Multiplication of Vulgar Fractions produce $\frac{24624}{100}$ or 246.24 The ſame holds in all other.

Diviſion of Decimals.

DIvide the Dividend by the Diviſor in all reſpects, as in whole Numbers, only obſerve that ſo many Decimal places as there are in the Dividend more than there are in the Diviſor, ſo many muſt be cut off from the Quotient to the right hand for Decimals.

Exam.

Example.

Divide 7.9 by 34.3

$$34.3\ )\ 7.9000\ (\ .230$$

686..

1040
1029

119

For $34.3 = \frac{343}{10}$ & $7.9 = \frac{79}{10} = \frac{79000}{10000}$.

$\frac{343}{10}\ )\ \frac{79000}{10000}\ (\ \frac{790000}{3430000} =$,200 near.

The reaſon of which is evident from Diviſion of Vulgar Fractions.

FINIS.

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